Claims

1. Monolithic ceramic material having micropores and mesopores or mesopores and micropores or micropores, mesopores and micropores, characterized in that it is at least partially decomposable under physiological conditions.

2. Material according to claim 1, characterized in that structural examination by means of X-ray diffraction displays no Bragg reflections in the small angle region.

3. Material according to claim 1 or 2, characterized in that at least part of the macropores and mesopores or macropores or mesopores present in the material form transport channels running through at least of the material.

4. Material according to at least one of the preceding claims, characterized in that the pore size has at least one property from the following group: the size of the macropores is from 0.1 µm to 100 µm, the size of the mesopores is from 5 nm to 50 nm and the size of the micropores is from 1 nm to 3 nm.

5. Material according to at least one of the preceding claims, characterized in that, after drying, it contains a higher proportion, measured in per cent by weight, of inorganic constituents then of organic constituents.

6. Material according to at least one of the preceeding claims, characterized in that it has at least one active metal center integrated into the pore structure.

7. Process for producing a monolithic ceramic material which has micropores and mesopores or mesopores and macropores or micropores, mesopores and micropores and is at least partially decomposable under physiological conditions, characterized in that the process comprises at least the following steps:

   (I) bringing a precursor material, a water-soluble polymer, an amphiphilic substance and a hydrolysis catalyst into contact with one another;

   (II) inducing the sol-gel transition of the mixture from (I);

   (III) at least partially removing and replacing the solvent in the gel from (II) or at least partially removing or replacing the solvent:

   (IV) drying the green body obtained from (III).

8. Process according to claim 7, characterized in that an additional calcination step (V)

   (V) calcining the dried green body,

   is carried out after step (IV).

9. Process according to claims 7 or 8, characterized in that the precursor material used in (I) contains at least one component containing a metal.

10. Process for producing a monolithic ceramic material which has mesopores and macropores and is at least partially decomposable under physiological conditions, characterized in that the process comprises at least the following steps:

    (I) bringing a precursor material, a water-soluble polymer and a hydrolysis catalyst into contact with one another;

    (II) inducing the sol-gel transition of the mixture from (I);

    (III) at least partially removing and replacing the solvent in the gel from (II) or at least partially removing or replacing the solvent:

    (IV) drying the green body obtained from (III);

    (V) calcining the dried green body at temperatures which do not exceed 500°C at any point,

11. Process according to claim 10, characterized in that the precursor material used in (I) contains at least one component containing a metal.

12. Process according to at least one of claims 7 to 11, characterized in that the precursor material is selected from the group consisting of completely hydrolysable alkoxides, alkoxides having at least one group which cannot be hydrolysed; halides which are decomposable in aqueous solution, polymerizable metal salts, oligomeric precursor materials, organically modified silicates; coordination compounds having carboxyl or β-diceton ligands; and combinations of two or more of the abovementioned substances.

13. Process according to at least one of claims 9 or 11, characterized in that the metal-containing component(s) of the precursor material is/are selected from the group consisting of organometallic compounds, metallocenes, metallic colloid, metal alkoxides and combinations of two or more of the abovementioned substances.

14. Process according to at least one of claims 7 to 13, characterized in that the hydrolysis catalyst is selected from the group consisting of basic substances such as ammonium, amines, ammonium ions solutions; acidic substances such as mineral acids, organic acids, fluoride-containing solutions; and combinations of two or more of the abovementioned substances.

15. Process according to at least one of claims 1 to 14, characterized in that the water-soluble polymer is selected from the group consisting of uncharged and ionic polymers, and combinations and mixtures of two or more of the abovementioned substances.

16. Process according to at least one of claims 1 to 15, characterized in that TEOS or a metal alkoxide or TEOS and a metal alkoxide is used as precursor material, nitric acid is used as hydrolysis catalyst, PEG is used as water-soluble polymer and CTAB is used as optional amphiphilic substance, and in that the PEG content is in the range from 2 to 10% by weight, based on the total weight, in that the molecular weight of the PEG is from 10000 to 50000, in that the relative proportion of TEOS, given as the "r" value, is in the range from 10 to 20, in that the proportion of CTAB which is used optionally is from 0.01 to 5% by weight, based on the total weight, and in that the solvent for the solvent replacement is ammonium hydroxide.

17. Process according to at least one of claims 1 to 16, characterized in that the material of the invention is subjected to an after-treatment which may be selected from the group consisting of: impregnating the monolithic ceramic material with, or bringing it into contact with, catalytically active substances, organic compounds or mixtures or further auxiliaries or additives, functionalising at least parts of the internal surface, lipophilising the material; successively loading the pores and all combinations of two or of the above steps.

18. Process according to claim 17, characterized in that the substance or substances for the impregnation or contacting comprises at least one carbon-containing precursor compound which contains at least one carbon atom.

19. Process according to claim 17 or 18, characterized in that the carbon-containing material of the invention is calcined at temperatures above 500°C under nitrogen after impregnation or contacting and is subsequently carbonized under reduced pressure.

20. Process according to at least one of claims 17 to 19, characterized in that the material of the invention in calcined after the after-treatment.

21. Material obtainable by a process according to any of claims 7 to 20.

22. Use of the monolithic ceramic material according to at least one of claims 1 to 6 or the monolithic ceramic material obtainable by a process according to at least one of claims 7 to 20 as all-active catalyst, as catalyst support, as molecular sieve, as biological separator, having a sharp cut off criteria in respect of the molecular weight, as osmotic membrane or as dielectric medium.

23. Use of the monolithic ceramic material according to at least one of claims 1 to 6 or the monolithic ceramic material obtainable by a process according to at least one of claims 7 to 20 for the temporally delayed and temporally controlled and regionally defined supply of substances of dyes, cosmetic active compounds, auxiliaries or additives, pharmaceutical relative substances, proteins, peptides, enzymes, active compounds derived from plants, nutrients or nutrient additives, animal feeds or animal feed additives, fragrance or flavours.

24. Use of the monolithic ceramic material according to at least one of claims 1 to 6 or the monolithic ceramic material obtainable by a process according to at least one of claims 7 to 20 as biodegradable or biologically resorbable or as biologically integrable ceramic material in medical technology, in particular for strengthening bone, for supporting connective tissue and for the healing of wounds.

25. Use of the monolithic carbon-containing material obtainable by a process according to at least one of claims 17 to 20 as storage material for hydrogen or as support material for a hydrogen storage material.

26. Use of the monolithic carbon-containing material obtainable by a process according to at least one of the claims 17 to 20 in combination with or doped with at least one medium capable of reversibly storing hydrogen selected from the group consisting of hydrides of the main group and transition metals, semimetal hydrides, mixed hydrides, alanates and mixtures of at least two of this substances.